

LVI. *An Answer to the preceding Remarks.*
By Mr. John Ellis, F. R. S.

Read Jan. 19, 1758. **M**Y letter to Mr. Webb, which is printed in the second part of the xlixth volume of the Philosophical Transactions *, was intended to shew this Honourable Society, that Mr. Miller, in his reply to the Abbé Mazeas's letter, had brought no proofs to lessen the discovery, which he tells us the Abbé Sauvages had made, in attempting to improve the art of painting or staining linens and cottons of a fine durable black colour, by making use of the juice of the Carolina pennated Toxicodendron, instead of the common method of staining black with gauls and a preparation of iron; which, he says, always turns to a rusty colour when washed.

Mr. Miller, instead of producing the proper proofs, to shew that this method of staining cottons and linens of a black colour was known before, or quoting the authors in which he says it is mentioned, contents himself with telling the Society, that this American Toxicodendron is the same plant with the true varnish-tree of Japan; and that callicuts are painted with the juice of this shrub.

In my letter to Mr. Webb, I have endeavoured to shew, that notwithstanding the authority of Dr. Dillenius, and the authors that have followed him, it does not appear, from Dr. Kœmpfer's description of this Japan plant, that it can be the same with our American one.

* Page 806.

VOL. 50.

LII

The

The design, then, of this paper, is to lay before this Society some further reasons, why these plants cannot be the same; and that even if they were the same, Mr. Miller has produced no authority to shew, that this juice was ever made use of for this purpose abroad; with some remarks on his reply to my letter, in which he obliges me to be more particular than I intended, in explaining some errors, which I find he has run into.

In my letter to Mr. Webb, I have pointed out the exact description, which Kœmpfer has given us of the leaves of this plant, shewing how much they differ from our American one: but now I shall mention some observations that escaped me before, and which, I think, will give us a clearer proof of this matter.

Kœmpfer, then, informs us, that this Japan varnish-tree, or *Sitz-dsju*, is a tree, not a shrub: and this author (it is well known) is remarkably exact in the description of his Japan plants, making the necessary distinctions between a shrub, an arboreſcent shrub, and a tree. He then goes on to explain the manner of its growth; and tells us, that it grows with long sappy shoots, very luxuriantly, to the height of a fallow or willow-tree, which we may reasonably allow to be from 20 to 30 feet: whereas this Carolina pennated *Toxicodendron*, as Mr. Miller tells us in his Dictionary, 6th edit. in folio, is a shrub, and seldom rises above five feet high with us: and many people, who have been in North America, agree, that it is but a slow grower there, and is one of the shrubby underwoods of that country: so that, allowing it to grow even double the height it does
here,

here, it is still but a shrub, in comparison with the other.

Further, while Dr. Dillenius was warm with this supposed discovery, of our having got the true Japan varnish-tree in America, attempts were made there, by intelligent persons under his direction, to procure this varnish after the manner of Kœmpfer; but without success, as I am assured by persons of that country now here, with whom the Doctor corresponded.

Let us now consult the growth of the Carolina and Virginia Sumachs, or *Rhus*'s, in our nursery-gardens, and compare them with this little shrubby *Toxicodendron*, and we shall find, that even in this cold climate nature keeps her regular proportionable pace in the growth of vegetables of the same country.

Let us observe the growth of some of these *Rhus*'s, and we shall find that great luxuriancy of the shoots, which Kœmpfer so justly describes in his varnish-tree. One of these American ones even seems to promise the same height as the Japan *Rhus*; whereas this little shrubby *Toxicodendron* still preserves the same dwarfish slow-growing habit, that it has in its native country.

This leads me, in the next place, to shew, that these two plants must be of different genus's; the one a *Rhus*, and the other a *Toxicodendron*: and if so, according to Mr. Miller, they ought to be properly distinguished, and not ranked together, as Dr. Linnæus has done.

In order to prove this, let us then examine Kœmpfer's description of the parts of the flower, and see

whether it does not answer exactly to the genus of *Rhus*; and whether the flowers are not male and female in themselves, that is, hermaphrodites, on the same tree. The original of Kœmpfer is as follows, p. 791 of his *Amœnitates*: “Flosculos continentes pumilos, et citra coriandri feminis magnitudinem radiantes, in luteum herbaceos, pentapetalos, petalis carnosis nonnihil oblongis et repandis, staminibus ad petalorum interstitia singulis, apicatis, brevissimis, stylo perbrevis tricipite, floris turbini infidente; fructus flosculum excipit gibbosus utcunque in rhomboides figuram compressus.” Whereas Dr. Dillenius, and the authors that have copied after him, say, that his *Toxicodendron* has the male blossoms on one plant, and the female on the other; from whence it must evidently be another genus.

It appears, however, that Dr. Dillenius was not altogether ignorant of this difference of genus in these two plants; but, rather than his *Toxicodendron*, which he had made agree exactly in the leaves, should not agree in the fructification, he makes the accurate Kœmpfer guilty of an unpardonable oversight, in not taking notice of the difference of the sexes of this varnish-tree in different plants: whereas we have just now shewn, that nothing can be more minutely and judiciously described, than he has done both the male and female parts of the blossom, which change into the fruit on the same plant.

The original of Dr. Dillenius's remarks on Dr. Kœmpfer's specimen runs thus: “Planta sicca, quæ in Japonia lecta, servatur in phytophylacio Sherardino, nostræ huic speciei examussum quadrat, id tantum

“ tantum sexus nempe differentia prætervisa fuit auctori.” Hence we find how this error came to spread, and this false synonym to be adopted by the botanic writers, who copied after Dillenius.

This shews us what little dependance we can have upon the result of that meeting, which Mr. Miller mentions he had with his botanic friends; where, from the similitude of leaves only, without the parts of fructification, they determined these two plants, so different in their growth, to be one and the same plant.

Mr. Miller remarks very justly, that the leaves of the same tree often vary much in shape, such as those of the poplar, fallow, &c.

But in answer to this, we may reasonably suppose, that Dr. Kœmpfer, who was on the spot, would not choose for his specimens leaves of the most uncommon sorts that were on the tree, and neglect the most common. This would be carrying the supposition farther than can be allowed, unless we suppose this author had not the understanding even of a common gardener; for otherwise, I am persuaded, Sir Hans Sloane would not have thought his specimens worth purchasing.

For another synonym to the true Japan varnish-tree, as also to Dillenius's pennated Toxicodendron with rhomboidal fruit, Mr. Miller brings in (in his answer to the Abbé Mazeas's letter) the Bahama Toxicodendron *foliis alatis fractu purpureo pyriformi sparso* of Catesby's Nat. Hist. vol. i. p. 40. so that he would have all these three different plants one and the same: and, in his reply to my letter, he still insists on it, that these two Toxicodendrons are the same. But

here I must beg the favour of this Honourable Society, when they come more attentively to consider this matter, to compare his answer to the Abbé Mazzeas's letter, and his reply to me, in this particular part.

I shall only at present take notice, that Catesby says, this Toxicodendron, with the pear-shaped fruit, grows usually on rocks in Providence, Ilathera, and other of the Bahama islands; and does not mention, that he ever saw it in Carolina. I cannot find it described by any author as growing in Carolina, or in any other part of the continent of North America: nor do I believe that there is a plant of it now growing in England, or that it is even the same genus with Dillenius's rhomboidal-fruited one, from the different structure both of its leaves as well as fruit.

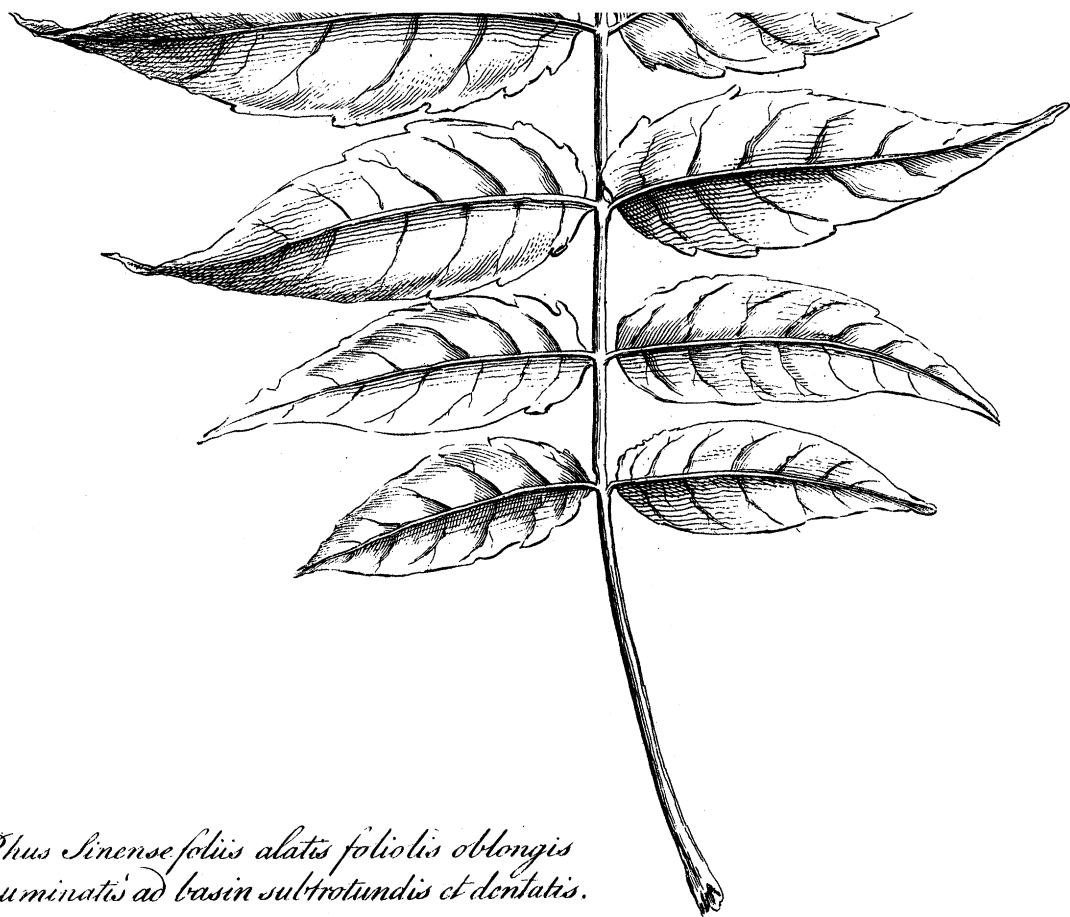
In looking over Dr. Linnæus's *Hortus Cliffortianus*, I find he gives this Bahama Toxicodendron of Catesby as a synonym to his *Elemifera foliis pinnatis*, p. 486.

I now come to that part of Mr. Miller's reply, relating to the China varnish-tree, that was raised from seeds sent to the Royal Society by Father D'Incarville; where he still insists on it, that this is the same with the spurious varnish-tree of Kœmpfer. His reasons are, that notwithstanding the indentation and roundness of the bottom of the lobe-leaves of the China varnish-tree, and tho' the lobe-leaves of the spurious Japan varnish-tree come to a point at the base, and are no-way indented, but quite even on the edges; yet he says, because they have an equal number of *pinnæ*, or lobe-leaves, on the whole leaf of each tree, they must be the same.

In







*Rhus Sinense foliis alatis foliolis oblongis
Acuminatis ad basin sulcatis et dentatis.*

J. Nyde delin et Sc.

Ex Horto Botanico Philippi Carter.

vi Carter Webb Army.

In answer to this, I say their lobe-leaves are not equal ; for I have examined both the specimens and drawings of Dr. Kœmpfer's spurious varnish-tree, and I don't find that the number of the *pinnae* exceed seven on a side : whereas I have a small specimen of a leaf by me, that was taken from the top of one of D'Incarville's China varnish-trees, which is above eight feet high, and stands in an open exposure ; and this leaf, tho' but a foot long, has 12 lobe-leaves on a side, and each lobe indented at the base *. At the same time I observed, that the leaves of the young shoots of another tree were a yard long, as they were this summer at the garden of the British Museum. Another thing is remarkable in the leaves of this China varnish-tree ; and that is, the lobes of the leaves, as they approach to the end, grow smaller and smaller ; whereas in the spurious Japan varnish-tree they are rather, if there is any difference, larger towards the end.

I shall make this further remark, that tho' these indentations on the lobe-leaves may vary in number in this China varnish-tree ; yet, as I observed before, since they are continued on even in the smaller leaves at the top of the branches of a tree eight feet high in the open ground, it appears to me, that this specific character, besides the form and insertion of the lobe-leaves, will ever distinguish it as a different species from the *Fasi-no-ki*, or spurious varnish-tree of Kœmpfer.

Mr. Miller now goes on to tell us, he is confirmed in his belief of their being the same, by making some observations on the seeds of this China varnish-

* See TAB. XVII. where this specimen is exactly delineated.

tree ; and therefore asserts, that they are the same. It is natural to suppose he compared them with the accurate drawings of the seeds of Kœmpfer's *Fasi-no-ki*, p. 794. that being the only place where the seeds of it are described.

In the very next paragraph Mr. Miller seems to forget, that from his own observations on the seeds of the China varnish-tree, he has asserted it to be the *Fasi-no-ki* of Kœmpfer ; but now he finds, in his memorandums, that those seeds were wedge-shaped, and like the seeds of the beech-tree ; and that all the three seeds he received seemed to be inclosed in one capsule : so that now he is at a loss what to call it ; and at the same time says I have been too hasty in calling it a Rhus.

Mr. Miller goes on, and allows this China varnish-tree changes to a purple in the autumn ; but not so deep as the true varnish-tree. I suppose he means, by this true varnish-tree, the Carolina pennated *Toxicodendron* ; for Kœmpfer has not told us what colour the true varnish-tree of Japan changes to in autumn.

But this is no certain proof on either side of the question, only a corroborating circumstance of the species of a tree : nor should I have mentioned it, but for the manner in which Kœmpfer, with an imagination truly poetical, describes the autumnal beauty of his *Fasi-no-ki*, or spurious varnish-tree. “ Rubore suo autumnati quâ viridantes sylvas suaviter interpolat, intuentium oculos e longinquo in se convertit.” Even this description would make one suspect it is not the same with the China varnish-tree, which, I am informed, did not turn purplish in the garden of the British Museum till the first frost came

came on: whereas it is well known, that some of the *Rhus*'s and *Toxicodendrons*, particularly the Carolina pennated one, change to a fine scarlet colour in the beginning of a dry autumn, even before any frost appears.

Mr. Miller seems surpris'd, how I should think, that the Carolina pennated *Toxicodendron*, or poison-ash is like the *Fasi-no-ki* of Kœmpfer. I must here acknowlege, at this time, not having seen Doctor Kœmpfer's specimen, I imagined, from the shape of the lobe-leaves (as he has described them) and from the remarkable scarlet colour of both these trees in autumn, that Mr. Miller might be right in what he has advanced; for it was from his authority I took it, depending on the information he gives us in his Dictionary, fol. edit. 6. under the article *Toxicodendron*, where he takes some pains to assure us, that they are the very same plants.

In the next paragraph I find Mr. Miller has intirely mistaken the meaning of one part of my letter to Mr. Webb; which I must recommend to him to read again, and he will find it exactly agrees with his own sentiments. There he will find my opinion is, that notwithstanding the change of soil and situation, this *Sitz-dsju*, or true varnish-tree, and the *Fasi-no-ki*, or spurious varnish-tree of Kœmpfer, are distinct species of *Rhus* or *Toxicodendron*, and will ever remain so.

Mr. Miller now desires me, since I have seen Dr. Kœmpfer's specimens in the British Museum, to declare, whether I think I am mistaken.

In answer to this, and to satisfy Mr. Miller as well as myself, I have been very lately at the Mu-

seum, and have looked very carefully over Dr. Kœmpfer's specimens, and do sincerely think, as did other judges at the same time, that the *Sitz-dsju* is not the same with the Carolina pennated *Toxicodendron*, nor the *Fusi-no-ki* the same with Father D'Incarville's China varnish-tree.

Mr. Miller informs us, that one of the best kinds of varnishes is collected from the *Anacardium* in Japan.

In answer to this, I must beg leave to shew the Society, that Dr. Kœmpfer does not so much as mention, that this *Anacardium* grows in Japan; but that the varnish, which is collected from it, is brought to them from Siam: and I believe it will appear plainly, from what follows, that there is not a plant of this kind in the kingdom of Japan; for Siam and Cambodia, especially the parts of those kingdoms, where Kœmpfer informs us this **Anacardium* grows, lie in the latitudes of from 10 to 15 degrees north, which must be full as hot as our West Indies: so that it is not probable, that it would bear the cold of the winters in Japan; for Japan lies from the latitudes of 33 to above 40 degrees north, which is about the same parallel with our North American colonies.

I shall now beg leave to lay before the Society that passage of Dr. Kœmpfer, which relates to this dispute, together with my translation of it, that it may be compared with Mr. Miller's translation, which he gives us in his reply to the Abbé Mazeas's letter, *Philosoph. Transf.* vol. xlix. p. 164. 2d paragraph.

* This is likewise called the Malacca Bean, from its growing in great plenty on that coast, near the equinoctial line.

Dr. Kœmpfer, in his *Amœnitates*, p. 793. speaking of the true varnish-tree, says, “ Colitur frequens
 “ in provinciis Tsi-kocko et Figo, in quibus inserti
 “ agris scapi radices agunt et caudices edunt post
 “ triennium vernicem suppeditantes. Optima regi-
 “ onis, quin totius mundi, vernix perhibetur circa
 “ urbem Jassino colligi. Vernicem ceres Japonica
 “ largitur oppido nobilem et pretiosissimam, sed ad-
 “ modum parcam; nec pro operibus, quæ regio
 “ construit, sufficeret, nisi prius cum, *Nam Rak*, i. e.
 “ vernice ignobiliore ex Siamio invec̃ta, pro basi illi-
 “ nerentur. Siamenſis vernix promitur in provincia
 “ Corſama, et regno Cambodiæ ex arbore Anacardo,
 “ incolis *Tong Rak*, i. e. *Arbor Rak* dicta, cujus
 “ fructus officinis nostris Anacardium dictus *Luk*
 “ *Rak*, liquor *Nam Rak* appellatur. Perforatus
 “ truncus immiſſo tubulo, tantâ copiâ fundit liquo-
 “ rem ut Sinæ, Tunquino et Japoniæ pro deliniendis
 “ utensilibus sufficiat, quin jam Bataviam et alia In-
 “ diæ loca vasis ligneis inclusa appellit.”

Which, translated into English, appears to me to be thus :

‘ This varnish-tree is often cultivated in the pro-
 ‘ vinces of Tsi-kocko and Figo: there they plant
 ‘ the cuttings or truncheons in the fields, which take
 ‘ root, and send forth vigorous shoots, which in
 ‘ three years time yield this varnish.

‘ The best varnish of the kingdom, nay, of the
 ‘ whole world, is said to be collected about the city
 ‘ of Jassino. The produce in Japan of this most
 ‘ noble and very precious varnish, is so very little,
 ‘ that there would not be sufficient for the wares
 ‘ made in the kingdom, if they did not first lay on

‘ a ground with an ordinary kind of varnish, which
 ‘ they call *Nam Rak*, and is brought to them from
 ‘ Siam.

‘ This Siam varnish is collected in the province of
 ‘ Corfama, and in the kingdom of Cambodia, from
 ‘ the tree *Anacardus*, called by the inhabitants *Tong*
 ‘ or *Tree-Rak*; the fruit of which is called in our
 ‘ shops *Anacardium*, or *Luk Rak*, and the liquor is
 ‘ called *Nam Rak*.

‘ To collect this liquor, they bore a hole in the
 ‘ trunk, and put in a tube. By this method they
 ‘ get as much of it as is sufficient not only to varnish
 ‘ all the utensils of China, Tonquin, and Japan, but
 ‘ it is even exported in close wooden vessels to Bata-
 ‘ via, and other parts of India.’

The original of Kœmpfer, p. 794. speaking of the
 true Japan varnish, is as follows: “ Prostat non sin-
 “ cera modo, sed et colorata, vel cinnabari nativa
 “ Sinensi, vel terra rubra (quam Batavi antea, nunc
 “ Sineses advehunt) vel atramenti popularis ma-
 “ teriâ.”

Which I apprehend may be read thus in English:

‘ This varnish is not only sold quite pure, but
 ‘ likewise coloured, and that with Chinese native
 ‘ cinnabar, and a kind of red earth, which the
 ‘ Dutch formerly, but now the Chinese, bring them;
 ‘ and also with the materials that they make their
 ‘ common (or Japan) ink of.’

Mr. Miller translates it thus (*See p. 164. vol. xlix.*
Phil. Transact.): ‘ This varnish is used without mix-
 ‘ ture to stain black: but the Chinese mix native
 ‘ cinnabar, or a red kind of earth, with it, to make
 ‘ a different colour.’

Here

Here we may observe, that Mr. Miller uses the words staining black; which is not the sense of the author, who, by mentioning the materials of Japan ink, shews, that even in varnishing black it was necessary to use this black mixture.

Further, Mr. Miller says, that the Chinese mix these colouring ingredients with this varnish: but the original plainly says, that the Chinese import them, and the Japanese mix them with rvarnish for sale.

And in a former part of this letter, p. 162. vol. xlix. Phil. Transf. he says, speaking of this true varnish-tree, that callicuts are painted with the juice of this shrub. But this bare assertion of his, without producing a proper authority, I am persuaded this Honourable Society will never admit as a matter of proof to invalidate the discovery of the Abbé Sauvages.

In looking over one of the numbers of Mr. Miller's Dictionary, under the title of Anacardium, I find he quotes a passage from Dr. Grew, which Sir Hans Sloane has placed among his observations on the Cashew-tree, *Hist. Jam. vol. ii. p. 127.* which is, that cottons are stained with lime, and the oil, or mellaginous succus, called Mel Anacardium (but for the account of this Mel Anacardium I shall refer to Parkinson's Theat. p. 1568); and Mr. Miller seems to think it difficult to know which of the Anacardiums is here meant.

One would be apt think, from this passage, and another that follows a little after in the same page of the Hist. of Jamaica, relating to the black dye of the melagoof this nut, that Sir Hans, at the time his history

was published, thought them, as Caspar Bauhin did, of the same genus, but different species; and therefore he has mixt the observations on both together.

For, immediately after mentioning the staining of cottons with this mellaginous succus, Sir Hans says, that the gum is, in faculties and colour, like gum-arabic; and that it is given internally in female obstructions; and that the juice stains linen, which will not wash out suddenly: but he says it is false, that they remain till they flower next year, as Du Tertre asserts.

Sir Hans further quotes, from an anonymous Brazilian author, that the apples stain linen; and that the gum is good to paint and write; and the bark dyes yarn and vessels serving for pots.

And in another place he quotes De Laet, who compiled a general history of America, and who likewise takes his quotation from an old Brazilian author, treating of the trees of Brasil, That the gum of the Acajou is used by painters; the bark is used to dye cotton-yarn and earthen ware. Here I must remark, tho' foreign to our present purpose, that in the original of Laet, what relates to the earthen ware runs thus: "*Et a faire de vaisseaux de terre.*" So that I believe it will appear more probable, that the bark of these trees was used rather to burn earthen ware vessels, than to dye them, as we find these earthen vessels were used to boil their victuals in.

These two quotations from Sir Hans Sloane confirm the former, with regard to the use of the gum; that is, its being fit, like gum-arabic, to be used for water-colours, and to make ink; and that it is the juice of the apple that stains, but this we find is not durable.

Mr.

Mr. Miller has now only the bark of the Cashew-tree left to support his argument. This the above-mentioned Brazilian writers say, that the native Indians of Brasil used to dye their cotton-yarn with ; but of what colour no mention is made. And whether this bark is used to give strength to this yarn, as we dye and tan our fishing-nets with oak-bark, or for ornament, is uncertain ; for a great deal of this yarn was used in the making their net-hammocks, as well as their coarse garments.

Mr. Miller then introduces Sir Hans Sloane, in opposition to Dr. Browne, whose History of Jamaica I had quoted, to prove that the juice of the Acajou was of the same nature and properties with that of the gum-arabic, and consequently not fit for varnish : whereas it plainly appears from the foregoing quotations, taken from Sir Hans Sloane, that Dr. Browne is right, and agrees exactly in opinion with him.

He then makes Sir Hans say, that the inhabitants of Jamaica stain their cottons with the bark of the Cashew-nut tree. By this, one would naturally conclude, that Mr. Miller has been endeavouring to prove, in opposition to the Abbé Mazeas's letter, that the art of painting or staining cottons of a fine deep black colour, equal to that discovered by the Abbé Sauvages, as described in his experiments on the Carolina Toxicodendron, was practised by the English forty or fifty years ago in Jamaica.

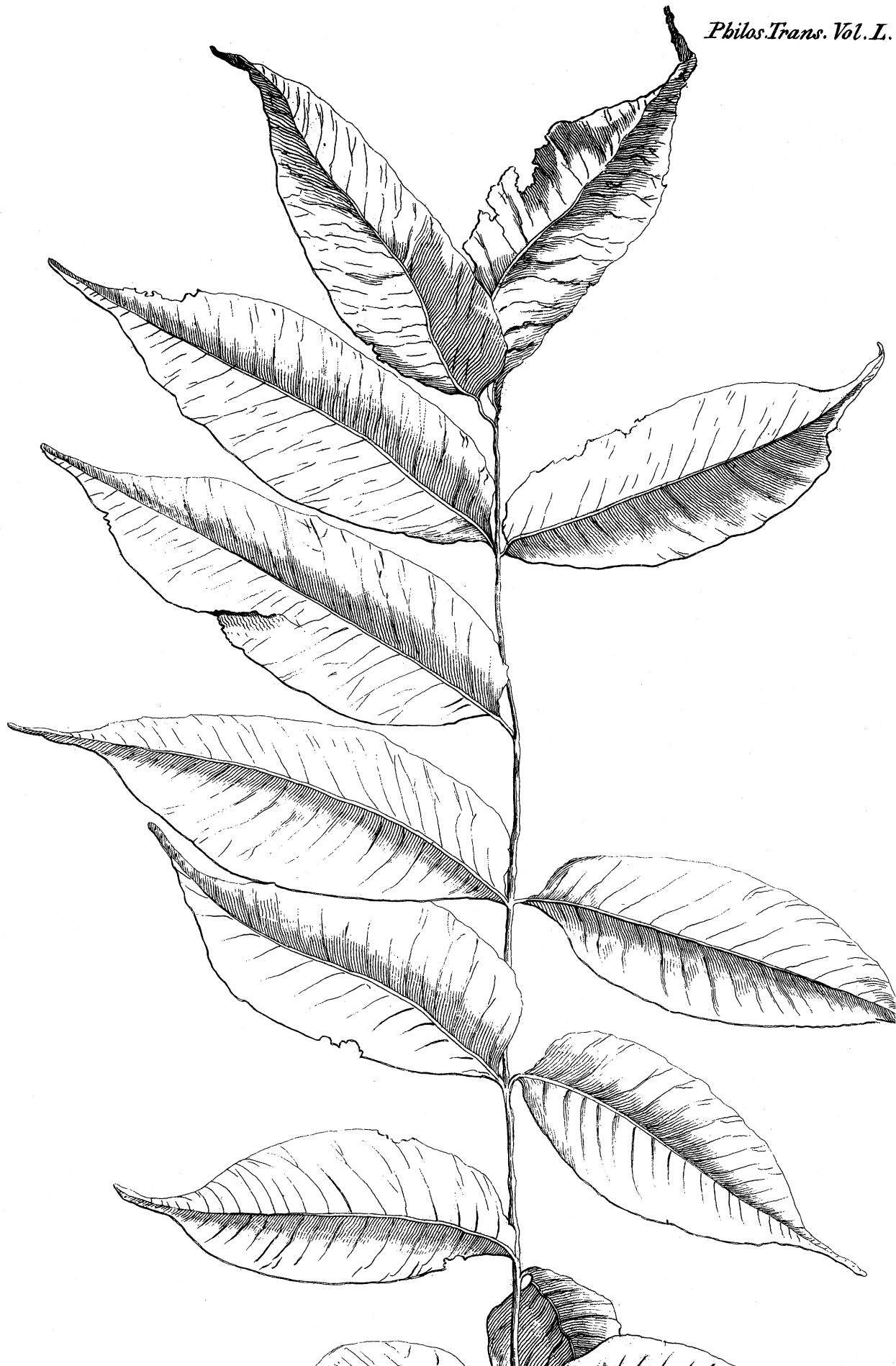
If this was the case, it is something surprising, that, notwithstanding our great intercourse with that island, the callico-printers of England never got intelligence of this valuable secret.

Further, if Mr. Miller will consult Pifo and Margrave,

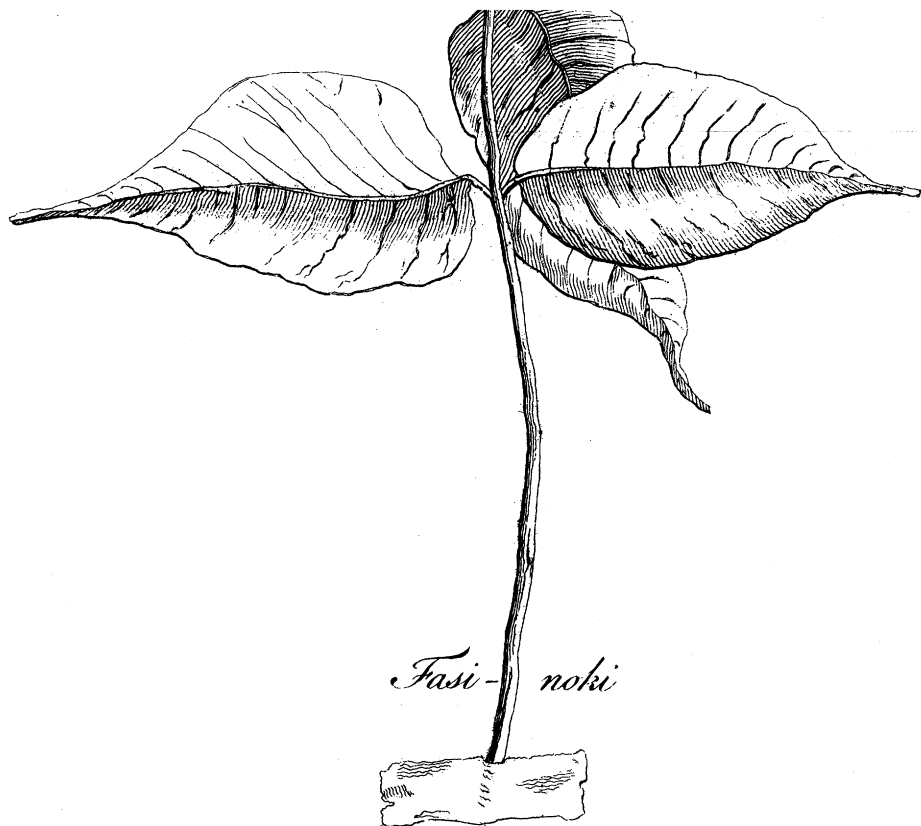
grave, writers of the best authority on the Brazilian plants, he will find their accounts of the Acajou exactly correspond with that delivered by Dr. Browne, in his History of Jamaica, as well as Sir Hans Sloane's: for they say, that the juice of this tree is equal in virtue, and mechanical uses, to the best gum-arabic. And if he still doubts, I shall lastly recommend him to go to the British Museum, and there he may see a most elegant specimen of the Cashew-gum, which will put this matter quite out of all doubt.

I shall now leave the decision of this controversy, which Mr. Miller has obliged me so fully to explain in my own vindication, to the candour and impartiality of this Honourable Society.

P. S. Since the foregoing paper was read, Professor Sibthorp was so kind to deliver me an exact drawing of the *Faji-no-ki* in the Sherardian collection at Oxford, taken by the Rev. Mr. William Borlase, F.R.S. the title and synonym of which are both in the Handwriting of Dr. Dillenius, as the Professor assures me. See TAB. XVIII.







Fasi-noki

*W. Borlase delin.
J. M. Sc.*

Toxicodendron foliis alatis fructu Rhomboide H. Elth. from Japan.

In Horto sicco Sherardi

○

Sherardi, Oron.



*Rhus Sinense foliis alatis foliolis oblongis
Acuminatis ad basin subrotundis et dentatis.*



Fasi-noli

Toxicodendron foliis alatis fructu Rhomboide H. Elth. from Japan.

*W. Borlase delin.
J. M. Sc.*

In Horto sicc. Sherardi Oxon.